

Abstract

New pseudomorphic high electron mobility transistors (pHEMT's) with extremely high device linearity having an $n^+/p^+/n$ camel-gate heterostructure and δ -doped sheet structure is disclosed. For the example of InGaP/InGaAs/GaAs δ -doped pHEMT's with an n^+ -GaAs/ p^+ -InGaP/ n -InGaP camel-gate structure, due to the p-n depletion from p^+ -InGaP gate to channel region and the presence of large conduction band discontinuity (ΔE_c) at InGaP/InGaAs heterostructure, the turn-on voltage of gate is larger than 1.7 V. Attributed to the applied gate voltage partly lying on the camel gate and influence of the carrier modulation, the change of total depletion thickness under gate bias is relatively small, and high drain current and linear transconductance can be achieved, simultaneously. The excellent device performances provide a promise for linear and large signal amplifiers and high-frequency circuit applications.